

The Emerging Project Bond Market

Covenant Provisions and Credit Spreads

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Abstract

The emergence in the 1990s of a nascent project bond market to fund long-term infrastructure projects in developing countries merits attention. Dailami and Hauswald compile detailed information on a sample of 105 bonds issued between January 1993 and March 2002 for financing infrastructure projects in developing countries, document their contractual covenants, and analyze their pricing determinants. They find that on average, project bonds are issued at approximately 300 basis points above U.S. Treasury securities, have a surprisingly high issue size of US\$278 million, a maturity of slightly under 12 years, and are rated slightly below investment grade. In terms of geographic origin, projects in Asia and Latin America have issued more bonds than those located in other regions.

Much of the recent work relating to the role of contractual covenants to the determination of bond prices has focused on the U.S. corporate bond market with its unique bankruptcy code (Chapter 11) and well developed legal framework, recognizing the bond contract as the sole instrument of defining the rights and duties of various parties. In circumstances in which the underpinning legal and institutional frameworks governing contract formation and enforcement are not well developed, the link between bond pricing and legal framework becomes important. This finding is confirmed by the authors' econometric analysis of project bond pricing model. So, investors take into account the quality of the host country's legal framework and reward projects located in countries that adhere to the rule of law with tighter credit spreads and lower funding costs.

This paper—a product of the Development Prospects Group—is part of a larger effort in the group to promote a healthy flow of investment capital to developing countries' infrastructure. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Sarah Crow, room MC2-358, telephone 202-473-0763, fax 202-522-2578, email address scrow@worldbank.org. Policy Research Working Papers are also posted on the Web at <http://econ.worldbank.org>. The authors may be contacted at mdailami@worldbank.org or hauswald@american.edu. July 2003. (35 pages)

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Emerging Project Bond Market: Covenant Provisions and Credit Spreads

I. Introduction

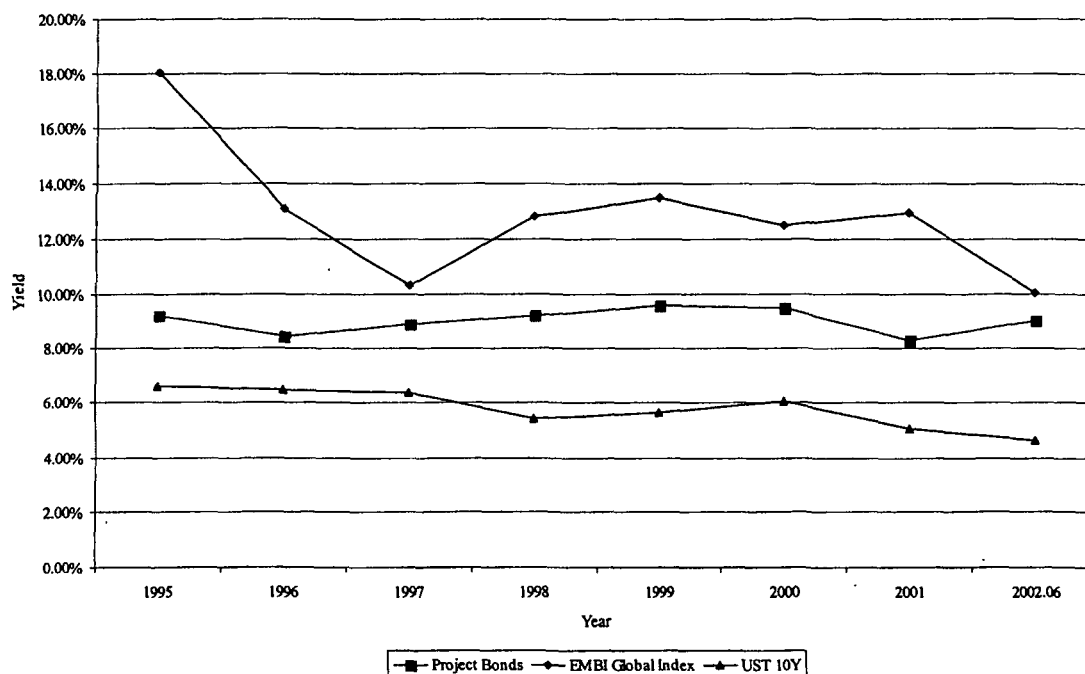
The emergence in the 1990s of a nascent project bond market to fund long-term infrastructure projects in developing countries, such as electric power plants, roads, ports, airports, telecommunications networks, and water and waste water facilities, merits attention for several reasons. First, they highlight the attractiveness of such investment opportunities that are traditionally the preserve of the public sector for private sources of capital. Second, project bonds are potentially a major source of long-term private debt capital linked directly to economic growth and competitiveness. Third, they are a new asset class in the emerging market debt spectrum, offering asset diversification and investment opportunities particularly to institutional investors, such as insurance companies and pension funds whose long-term liabilities match the long-term tenor of project bonds. Finally, they mirror the shift in the pattern of capital flows from bank loans to publicly issued bonds.¹

Although the volume of capital raised through international project bonds remains relatively small, the market has gained maturity in a very short time span, delivering a series of high profile transactions such as US\$1.2 billion issued by the Ras Laffan Liquefied Natural Gas project in Qatar, US\$1 billion issued by the Petrozuata heavy oil project in Venezuela,² and US\$125 million issued by the Quezon power project in the Philippines. Today, the market encompasses a broad range of project types, issue sizes, seniorities, and maturities. The total issuance volume worldwide has been on the order of US\$25 billion (2000-2001) of which about one third is attributed to bonds issued by projects located in developing countries. The market's long-term prospects, driven by the massive infrastructure needs in developing countries, look very promising.

¹ For more on global capital flows see the *World Bank Global Development Finance 2003*; capital flows to infrastructure development are discussed in Dailami and Leipziger (1998).

² See Dailami and Hauswald (2001) for an in-depth analysis of the Ras Laffan project and the role that international bond finance played in its successful design and completion. Esty (1999) describes the Petrozuata project, a heavy-crude oil project in Venezuela that provides a complementary example to Dailami and Hauswald (2001) and shows how international bond finance could be accessed despite complex legal, contractual, and political risks.

Project Bond, Emerging Sovereign, and 10Y US Treasury Yields



Note: All yields are yields to maturity; the Emerging Market Sovereign yields are from the JP Morgan EMBI Global index.

This note examines the emergence and growth of this market as a new asset class within the emerging-market debt spectrum. The evolution of project bonds is benchmarked against the more established fixed income markets in terms of pricing (at-issue spreads) as well as legal structures and covenant provisions. An examination of a sample of such bonds issued between January 1993 and March 2002 reveals that project indentures contain the standard covenant provisions aimed at mitigating conflicts of interest between bondholders and shareholders that manifest themselves through asset substitution, dividend policies, claim dilution, and under investment (Warner and Smith 1997). In addition, project-bond indentures contain clauses that serve as commitment and incentive devices for host governments and other contracting parties to the project.

In terms of borrowing cost, we find that project bonds are priced at a considerable markup (average 300bps spread) over comparable US Treasury securities, but with a high degree of variation across bonds that depends on project-specific characteristics, bond features, and the quality of host-countries' legal institutions in determining investor rights and the degree of their protection. However, the preceding graph also shows that project bonds, despite wide variations in number of

issues and their size, have consistently carried issue yields below comparable emerging-market sovereign yields (JP Morgan's EMBI Global Index). Two factors are at work. First and foremost, only the most creditworthy projects can tap the markets and, therefore, often carry a comparatively higher credit rating. Second, issuers take particular care in designing their projects' organizational, legal, and financial structure when they wish to fund them in public debt markets. Taken together, both forces suggest that the at-issue spread evolution depicted above is largely due to self-selection by borrowers: only high-quality and well-designed projects and their bonds come to market which then carry credit ratings and issue-yields below a much larger and diverse group of sovereign borrowers.

This note is organized as follows. We next discuss the key economic and financial issues in the international project-bond market before turning to the legal design of typical project bonds in Section III. Section IV summarizes our analysis of credit-spread determinants that highlight the importance of the ambient institutional development, and Section V concludes.

II. Key Characteristics of the Project-Bond Market

Access to the international bond markets by infrastructure projects in emerging economies is a relatively new phenomenon, borne of the economic reforms, market liberalization, and financial innovations in the early 1990s. The world-wide move towards private participation in infrastructure (PPI) schemes that gained momentum in the early 1990s brought about fundamental changes in the traditional fiscal financing of infrastructure facilities.³ It also ushered in structural changes in the way in which infrastructure was operated and managed as a pre-requisite for successful private funding of projects. For instance, the development of structured credit techniques, most prominently limited recourse project financing methods, along with various risk sharing and hedge devices (multilateral and export credit agencies (ECA) guarantees, private political risk insurance), were instrumental in containing projects' credit risk sufficiently to make them of interest to bond investors. At the same time, privatization, market liberalization, and regulatory reforms created an economic environment that could provide private investors with return potentials that could justify the considerable risks associated with debt investments in emerging market infrastructure.

³ Brealey, Cooper and Habib (1996) contains an excellent survey of the economic issues involved in project finance.

An important factor contributing to investor interest has been the creative design of the debt securities' legal structures such as indenture, trust structure, selective guarantees, and covenant provisions to mitigate risks and provide contractual protection to bond holders. Financial economists have long recognized the adverse incentives that debt finance provides to shareholders and managers and the agency costs that those entail. Smith and Warner (1979) discuss how bond covenants typically attempt to address various conflicts of interest between different classes of claim holders while Green (1984) and John (1987) formally analyze the incentives that leverage creates for shareholders (project sponsors) to enhance their own returns by shifting risk to debtholders through project attribute selection.

While most project bonds are corporate bonds, the reverse is not true. There are subtle financial, economic, and analytical differences between the two segments that merit further attention in the context of an institutional analysis of the market. The dissimilarities primarily stem from the underlying economics of the borrower. In the case of a project, the issuer raises funds to finance a single indivisible large-scale capital investment project whose cash flows are the sole source to meet financial obligations and to provide returns to investors.⁴ In the case of a typical corporate borrower, the security is typically issued against the firm's general credit and the underlying assets consist of multiple sources of cash flows. Hence, typical corporate bonds are secured by all the firm's various assets and cash flows that offer in themselves risk diversification and an important cross-insurance mechanism. If a certain set of cash flows becomes unavailable for debt service, firms typically have other sources of cash that might tide the issuer over the liquidity crisis.

No such cross-insurance exists in the case of project bonds: the moment the single source of cash flows ceases to exist, the issuer experiences a liquidity crisis that might force it to default on its bonds. In addition, projects suffer from asset-specificity (location and/or use of the assets), often ill-defined or ill-enforced property rights, and bilateral monopoly settings (dominant output buyer) that render them vulnerable to opportunistic behavior and unilateral contract renegotiation. Indeed, such opportunistic behavior coupled with shortcomings in the ambient legal institutions is often at the root of project's economic distress and, ultimately, financial distress.

⁴ On the other hand, the single source of cash flows and limited number of contractual relations facilitated the analysis of project bonds.

These often overlooked, but crucial differences between project and general corporate bonds subtly affect investors' risk perceptions, the pricing of the bonds, and their legal structure. In particular, investors do not tend to view the underlying assets as "true security" even if they are pledged as such, but take into account and price factors, such as the creditworthiness of off-takers, third-party guarantees, the legal and institutional environment, and, ultimately, the quality of the cash flows. Put differently, investors in project bonds are much more cash-flow quality oriented than buyers of typical corporate bonds and tend to price factors that determine the underlying economics of the project. However, since projects and their securities demand much more careful analysis of the issuer's economic and legal structures, buyers of project bonds are mostly sophisticated institutional investors that have the requisite analytical expertise, rather than retail investors.

In order to document current trends and best practices in the international project-bond market, we collected a representative sample of 105 emerging market project bonds issued between January 1993 and March 2002. The issue information that we cross-checked with other data sources comes mainly from Bloomberg and Interactive Data Corporation (IDC). If the spread-at-issue over comparable US Treasury securities is not provided, we calculate it from the bond's issue yield and the yield of an interpolated maturity-matched Treasury security. Bond prospectuses and ratings studies from Moody's and Standard & Poors provide the necessary information on the projects' contractual structure, its off-take (output supply) agreement, the bond covenant, and legal terms and conditions.

Table 6 in the Appendix lists all our bonds by country and provides specific information on the terms and structure of each issue. Our sample reflects a broad cross-section of countries, project types, and sectors. International project bonds differ widely in their issue size, maturity, issue spread, host country sovereign spread, underlying project structure, legal characteristics, and covenants. Issue size ranges from US\$23 million (LIGHT, Brazil) to US\$1 billion (Kowloon-Canton Railway Corp., China, and Pemex Mexico) their rating by Moody's from AAA to B2, their maturity from less than three years (Transportadora de gas del Sur, Argentina) to 100 years (albeit callable after 30 years), and the yield at issue over US Treasuries from 10 basis points for a convertible bond by a Chinese issuer to 802 basis points for a South-African one. The following table summarizes typical characteristics of project bonds on the basis of our sample.

Characteristics	Mean	Std. Dev.	Min	Max
Spread over US Treasuries	297.80	173.81	10	802.17
Amount	278.07	201.62	23	1000
Maturity (years)	11.82	10.50	2.97	100
Rating classification (average of Moody's and S&P)	BBB/BBB-	3 notches	B	AAA

Based on a sample of 105 infrastructure-related, US dollar-denominated international bonds issued by projects in 20 emerging economies (Argentina, Brazil, Chile, China, Colombia, Czech Rep., Dominican Rep., Hong Kong, India, Indonesia, Malaysia, Mexico, Panama, Philippines, Qatar, Russia, South Africa, South Korea, Thailand, and Venezuela).

On average, emerging-economy project bonds are issued at approximately 300 basis points above US Treasury securities of comparable maturities, have a surprisingly high issue size of US\$278 million, a maturity of just under 12 years and are rated slightly below investment grade (exactly between BBB- and BBB). Most project bonds are senior debt or issued against a collection of project receivables as asset-backed securities (ABS). The latter type of debt, while not explicitly senior obligations of the project, are issued as *pari passu* instruments that will become de facto senior once other unsubordinated debt comes into existence.

Unsecured debt tends to be rated higher than secured debt, possibly reflecting the fact that higher rated projects can afford to provide less security to their investors. In terms of geographic origin, international project bonds from Latin America and Asia are more numerous than from Eastern Europe, the Middle East, and Africa. All major project types are represented albeit with a particular concentration of issues in the energy, power, telecom, and transport sectors.

III. Covenant Provisions

A fruitful conceptual framework for analyzing projects and, in particular, their organizational, contractual, and financial design relies on the view of the firm as a nexus of contracts. First formulated in the seminal papers by Alchian and Demsetz (1972) and Jensen and Meckling (1976), it underlies much of modern corporate finance. The allocation of control rights and interaction of all constituent contracts of a firm (infrastructure project) motivate financing choices (Fama, 1990), determine corporate governance arrangements (Jensen and Meckling, 1976), and even provide a framework for project valuation (see Kaplan and Ruback, 1995 for an application in terms of discounted cash flows). Hence, we would expect bond covenants of projects that, by their very nature, most closely correspond to the stylized view of the firm as a nexus of contracts, to reflect and

address conflicts of interests not only between different claimholders but also other stakeholders, such as host governments and customers, in the project.

Projects suffer from typical contracting problems arising from relationship specificity, sunk costs, and the associated “hold-up” problem that were first described in other areas of economics by Klein, Crawford, and Alchian (1978), and Williamson (1979, 1983). Three types of solutions have been proposed in the literature that balance incentives for *ex-ante* efficient investments and *ex-post* trade efficient: (i) writing contracts with proper legal remedies in case of breach of contract (Shavell, 1980 and 1984; Rogerson, 1984), (ii) agreeing on a rule for the re-negotiation of contracts (Aghion, Dewatripont and Rey, 1994), and (iii) writing option contracts (Nöldeke and Schmidt, 1995). In addition, the parties can always attempt to write a self-enforcing contract so that, as Jensen and Meckling (1976) have argued, conflicts of interest between bondholder and stockholder are resolved through the contractual and financial design of firms. This insight underlies much of our analysis of project bond covenants that we can take to be the contractual responses to the afore-mentioned contracting problems.

Since the presence of risky debt in a firm’s capital structure can lead to *ex post* conflicts of interests between the firm’s equity holders and bondholders, contractual devices such as debt covenants have evolved to mitigate their adverse consequences. For instance, companies that issue bonds either on a project (non-recourse) or corporate (on-balance sheet) basis, be it in domestic or in international markets, generally agree to a set of contractual covenants requiring them to take or to refrain from taking certain specified actions. Such actions are designed fundamentally to protect the interest of bondholders—safety and seniority of their claims, repayment, and legal remedies in the event of default—after the bonds have been issued. Covenant provisions contained in bond indentures typically take the form of restrictions on dividend, M&A transactions, and asset disposals, limitations on indebtedness, requirements of third party guarantees, maintenance of good regulatory standing and, in certain circumstances, the establishment of offshore and debt service reserve accounts. Violations of such provisions usually trigger contractual penalties or renegotiation and might ultimately lead to default and court-supervised bankruptcy proceedings.

The ability to design and enforce solid bond covenants to protect the interest of bondholders is a critical factor for infrastructure projects located in developing countries in tapping offshore markets for financing. The complexity of infrastructure project finance transactions—

involving multi-source financing structures, numerous public and private contracting parties, and intricate contractual arrangements and legal documentations, compounded by the weakness in the legal and institutional framework to protect investors interests—makes this task a challenging one.

The specific covenants included in a particular debt agreement and the extent to which such covenants effectively serve to protect the interests of creditors depend *inter alia* on the nature of the debt instruments, governing law, and the underpinning legal and institutional frameworks governing contract formation and enforcement. Given that the writing, negotiating, and monitoring of specific provisions are costly, two sets of considerations become relevant: the ease with which the stipulated covenants can be monitored, and the scope for potential opportunistic behavior that could lead to transfer of wealth from bondholders to shareholders.

More generally, investors are concerned about the availability of legal recourse that depends on the bond's terms and the quality of the legal and institutional environment in the host country. An examination of the project bond covenants in our sample reveals that project bond indentures contain the usual covenant provisions aimed at mitigating typical shareholder-bondholder conflicts such as asset substitution, dividend policies, claim dilution, and underinvestment (Warner and Smith, 1997). In the absence of sufficient contractual protections, the outcome is likely to be an inefficiently low investment, often referred to as the under-investment phenomenon (Hart and Moore, 1988).

In addition, they contain two further categories of clauses that arise from the very specific nature of project finance. Project debt covenants include *incentive provisions* for the contractors, operators, and sponsors such as performance targets, mandatory penalties, and minimal equity participation in the project. They also contain *institutional environment provisions* that, in case of changes in the ambient regulatory, legal, or tax environment, trigger change of control and/or mandatory redemption of the debt that would assure bankruptcy and operating disruptions of the project. Akin to poison pills, such provisions strengthen the position of (foreign) creditors vis-à-vis the host country and its policies.

From our 105 project bonds, we extract a subsample of 27 bonds for which we have detailed covenant information from offering circulars, regulatory filings, and rating analyses. As the

following table shows, the summary statistics for the subsample mirror the financial characteristics of the full sample:

Characteristics	Mean	Std. Dev.	Min.	Max.
Spread over US Treasuries	182	117	10	375
Amount*	319.49	193.51	180.00	800.00
Maturity (years) **	10	3	5	18
Rating classification (average of Moody's and S&P)***	BBB+/BBB	2 notches	BB	A+
(*) Ras Laffan issued the largest and AES China the smallest amount				
(**) Ras Laffan has the longest and China Telecom the shortest maturity				
(***) CEZ Finance has the highest and Fideicomiso Petacalco with the lowest credit rating				

Based on a subsample of infrastructure-related, USD-denominated international bonds issued by projects in 5 emerging economies (Chile, China, the Czech Republic, Mexico, the Philippines, and Qatar) for which full covenant information is available.

All project bonds in our sample are issued under New York Law. This particular segment of emerging market debt has often acted as an innovating force and contractual catalyst as the following example shows. While project bonds often contain collective action clauses such as qualified majority rules to limit inter-creditor conflicts of interests, comparable sovereign-bond indentures issued under New York law typically did not have such provisions until recently. However, established market practices seem to be changing as the Republic of Mexico recently offered a global bond with a qualified majority clause (February 2003) followed by Brazil (April 2003).⁵ In some sense, sovereign borrowers from emerging economies follow more established corporate precedent in order to insure a better reception of the issue by investors.

A preliminary analysis shows that project covenant provisions differ widely in their stringency. The more projects are removed from their sponsors as measured by specific references to their limited-recourse status (about 52 percent), the more restrictive their covenants tend to be. As stand-alone investments representing a single source for cash flows, debtholders require additional assurance that cash flows (and operations) are not used to enhance shareholder value to their detriment.

⁵ For more on the Mexican issue see Dailami and Kim, "Mexico's Collective Action Clause Bond," *International Finance Briefing Note* 24, March 7, 2003, The World Bank; the Brazilian issue is discussed in the *International Finance Review*, May 2003.

Category	Provision/Restriction	Type	Frequency
Project driven	Limited recourse status		52.31%
	Limited recourse definition		28.57%
	Collateral		33.33%
		Fixed asset	14.28%
		Receivables	38.09%
		Off-shore trust account	28.57%
	Intercreditor Agreement		9.52%
Stakeholder incentives	Capitalization requirements		19.05%
	Party-specific equity stakes		19.05%
	Performance-contingent put provision		17.64%
	Performance targets, penalties		4.76%
Government incentives	Mandatory redemption for concession cancellation		23.80%
	Redemption for change in tax law or regulation		66.67%
	Maintenance of government approval, regulatory compliance		19.04%
Asset substitution	Put provision		9.52%
	Contingent put provision		17.64%
	Cost overrun		9.52%
	Asset sale, lease-back		85.71%
	Transactions with affiliated firms		23.80%
	Counter-party restrictions		9.52%
	Nature of business		42.85%
	Use of funds		23.80%
Claim dilution	Additional indebtedness		73.68%
	Lien limitations		100%
	M&A restrictions		95.23%
	Collateral value preservation		19.04%
	Modification of indenture		85.71%
	Reporting requirements		80.95%
	Maintenance of insurance		33.33%
	Equity conversion		5.00%
	Permission of highly-leveraged transactions		28.57%
Payments	Dividends, debt-service coverage ratio restrictions		47.62%
	Sinking fund		35.00%
	Third-party guarantees, debt service reserves		26.31%
	Default definition		85.71%
Underinvestment	Call provisions		26.67%
	Investment limitations		33.33%

Based on information extracted from the offering documents (registration filings, offering circulars, rating studies) available for a subsample of 27 infrastructure-related, USD-denominated international bonds. The Frequency column records the frequency of occurrence of the respective provision types in the bond covenants. In particular, we classified project-bond covenant provisions into 45 broad categories and seven instrument-specific classes and attributed for each bond indenture containing a particular clause or feature a 1, and 0 otherwise.

While all indentures contain sensibly the same standard provisions aimed at preventing asset substitution, claim dilution, cash payments, and underinvestment, two thirds of the bonds also include project-specific stipulations. Most telling are minimal ownership requirements (19 percent of covenants) for sponsors, operators, contractors, and off-takers. Clearly, such provisions are meant to align the interests of certain stakeholders crucial to the project's commercial success

with debtholders. Equity stakes act as commitment and incentive devices for key players. Provisions specifying remedies in case of cost overruns (24 percent of indentures), performance targets (5 percent), capitalization requirements (19 percent), and restrictions on counter-parties (10 percent) further protect the interests of debtholders.

A second set of covenant provisions address the institutional environment and possible opportunistic behavior by regulators and host governments. Roughly one quarter of indentures (24 percent) provide for mandatory debt redemption in case of concession cancellations (a further 17 percent offer optional redemption at the discretion of the bondholders in case of completion, financing, or operating problems). Conversely, 22 percent of covenants stipulate that the projects are to maintain government approval and comply with all laws, rules, and regulations applicable to the project. The objective is clear: on the one hand, the project is not to give the host country any reason to intervene. On the other, mandatory redemption in case of concession cancellations forces the project into bankruptcy so that the ensuing disruption of service is meant to dissuade the host country from unilateral regulatory actions. In the same vein, 77 percent of all indentures require mandatory or optional early redemption in case of changes in tax regulation.

IV. Determinants of Credit Spreads

The cost of international bond financing for infrastructure projects in emerging economies is a key determinant of their tariff structure and, hence, economic viability. Our analysis of at-issue credit spreads of emerging market project bonds over US Treasuries reveals how legal, regulatory, economic, and financial institutions in host countries influence risk perceptions and, hence, the cost of debt for infrastructure development. We find that market risk perception in terms of at-issue spreads over US Treasury bonds are a function of a project's contractual structure and its ambient institutions. Since it is nearly impossible to anticipate on all contingencies in writing the contract, and since parties might have an incentive for opportunistic behavior, contracts are always incomplete by their very nature and need to rely on other institutions for their execution.⁶ It emerges that the quality of the ambient institutional environment is an important factor for market risk perceptions and the initial pricing of project bonds.

⁶ According to the transaction-cost approach, contract incompleteness is attributed to high transaction costs of writing, negotiating of contracts, and costs associated with monitoring contractual performance; see, for instance, Joskow (1987, 1988), Hart (1988), and Aghion and Bolton (1992).

In theory, the (second-best) optimal choice of debt contracts can mitigate some of these risks as long as investors can threaten the firm with a future cost that one could interpret as collateral realization (Diamond, 1984; Gale and Hellwig, 1985; or Bolton and Scharfstein, 1990), withholding of new financing (Gromb, 1999), or liquidation (Hart and Moore, 1994 and 1998). In practice, the effectiveness of such covenant provisions critically hinges on the quality of the ambient legal institutions required to make the investors' threat credible and, thus, the contract self-enforcing. Hence, we would expect pricing to be a function of the institutional environment and project attributes bonds in addition to the nature of their covenants.

The institutional, political, and economic environment feeds through to project-bond pricing through the market's collective assessment of the issue's systematic and idiosyncratic risks and, hence, the premium that bondholders demand over comparable default-free sovereign bonds. First and foremost, investors take into account the likelihood of debtor default and recovery in bankruptcy. In the context of project bonds, counter-party (off-take), price, and demand risk drive idiosyncratic risk perceptions, while political, macroeconomic, and institutional factors such as definition and enforcement of property rights determine the systematic ones. The institutional environment, often overlooked or taken for granted by researchers and practitioners alike, is of particular importance as it can mitigate or amplify the degree to which counter-party and political risks feed through to creditors. Put differently, deficiencies in the institutional development of a host country might exacerbate the market's perception of counter-party and other risk factors in pricing bonds. It also explains why project-rating analyses pay particular attention not only to the project's contractual structure but also to its ambient legal, regulatory, and political environment.

Traditionally, empirical studies of credit spreads have analyzed the dynamic aspects rather than cross-sectional ones such as the legal and institutional factors affecting corporate bonds (Longstaff and Schwartz, 1995 or Duffee, 1998), reflecting the focus of much of the theoretical work in this area. However, recent work by Madan and Unal (2000) linking default rates to structural factors implies that credit spreads are linearly related to firm-specific and exogenous variables. In contrast the recent theoretical literature (e.g., Duffie and Singleton, 1999), this approach provides a solid theoretical foundation for the nascent empirical literature on the cross-sectional determinants of credit spreads. Closest to our analysis are Elton *et al.* (2001) who relate the cross-sectional variation of US corporate yield spreads to factors other than default expectations such as taxes and equity risk factors. However, they do not study the impact of issuer-specific contractual

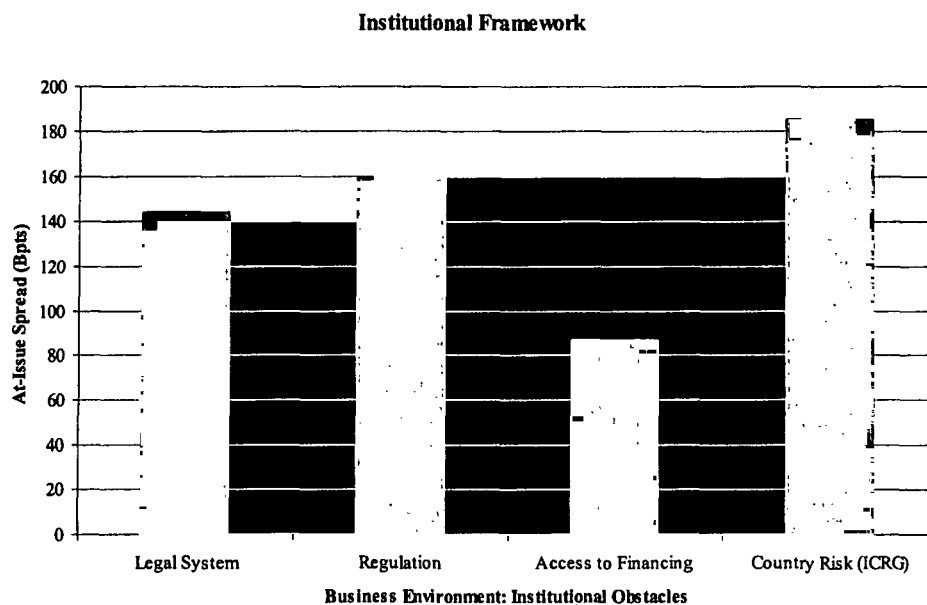
and organizational design factors on credit spreads, nor the impact of institutional factors such as the quality of legal, regulatory, and political institutions.

In analyzing the determinants of (at-issue) spreads of project bonds, we relate project credit spreads over US Treasuries to the relevant issue information (amount, maturity, rating), a set of variables extracted from the bond's covenant provisions (seniority, collateral, etc.), industry indicator variables (energy, power, water, etc.), factors capturing financial and economic aspects of the underlying project, a set of host country economic indicators (GDP, growth, etc.), and a set of indices measuring a host country's quality of financial, legal, and political institutions in a cross-sectional random-effect regression framework. Tables 2 and 3 contain detailed summary statistics on our explanatory variables while table 5 describes the institutional variables in more detail.

More precisely, we estimate the following linear cross-sectional model of project credit spreads by random country-effects regressions:

$$\begin{aligned}
 SPREAD_i = & \beta_0 + \sum_{1 \leq k \leq K_1} \beta_k ISSUE_{ki} + \sum_{K_1 < k \leq K_2} \beta_k BCOV_{ki} + \sum_{K_2 < k \leq K_3} \beta_k 1_{IND_{ki}} + \sum_{K_3 < k \leq K_4} \beta_k PROJ_{ki} \\
 & + \sum_{K_4 < k \leq K_5} \beta_k x_{kj} + \sum_{K_5 < k \leq K_6} \beta_k INST_{kj} + \sum_{K_6 < k \leq K_7} \beta_k BCOV_{kj} \cdot INST_{kj} + v_{ij}, \quad v_{ij} = e_{ij} + u_i
 \end{aligned}$$

where the dependent variable *SPREAD* is the at-issue spread over US Treasuries of project *i*'s bond, *ISSUE* the relevant issue information (amount, maturity, rating), *BCOV* a set of variables the bond's covenant provisions (seniority, collateral, etc.), *IND* industry indicator variables (energy, power, water, etc.), *PROJ* capturing financial and economic aspects of the underlying project, *x* a set of host country *j* economic indicators (GDP, growth, etc.), *INST* indices measuring host country *j*'s quality of financial, legal, and political institutions, and the last term interacts covenant provisions and institutional variables. While table 4 in the Appendix provides detailed results of our empirical analysis, the following diagrams summarize our findings in terms of the institutional, issue terms, and sector effects.

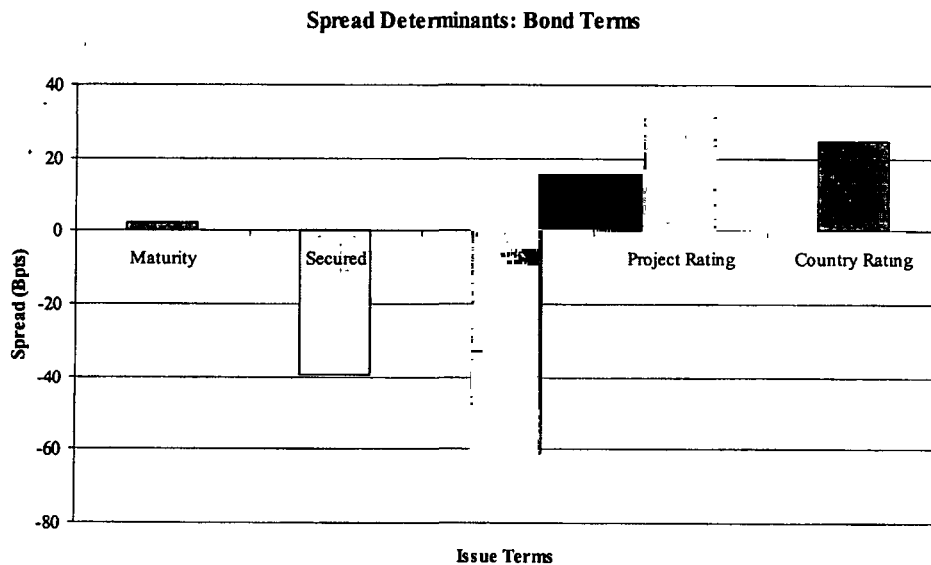


Results from cross-sectional regression analysis of the at-issue credit spreads of 105 international project bonds from emerging economies suppressing various control variables. Institutional variables derived from the 1996/97 and 2000/01 Business Environment Surveys conducted by the World Bank. The bars represent the effect on credit spreads of an increase by one category in an institution perceived as an obstacle to business (e.g., going from minor to moderate obstacle) with dark bars representing variables statistically significant at the 1 percent or 5 percent level.

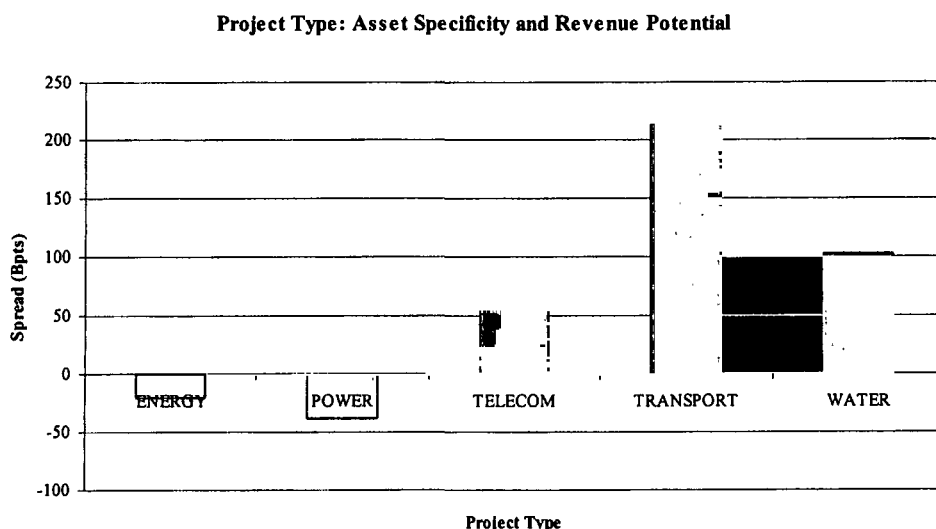
Among the institutional variables, legal and regulatory obstacles have the largest and statistically most significant effect: an increase of 1 in the obstacle score for the judiciary increases at-issue spreads by 144 basis points (bpts), for the regulatory and tax variable by 159 bpts (see specification 1 in table 4). Similarly, a 10 point increase in the ICRG composite risk index (e.g., from low to moderate country risk) increases project bond credit spreads by 150 bpts. Insufficient financial development also widens at-issue spreads but the effect is not statistically significant: the recourse to global debt market helps to overcome financing constraints that local firms typically face as an institutional impediment. These findings underline the importance of the ambient legal framework and institutional development for access to external financing, first pointed out by La Porta *et al.* (1997 and 1998). Similarly, Modigliani and Perrotti (1998) argue that quality of legal enforcement is a determinant of the form of debt borrowers choose.

Regarding bond and project characteristics (specification 2 in table 4) it emerges that maturity and credit ratings are two very significant determinants of at-issue spreads: one additional year of maturity increases spreads by 2 bpts. A decrease in project rating by one notch (e.g., from BBB+ to BBB) increases spreads by 31 bpts, a similar decrease in the host country's rating by

24 bpts. Since project and host country ratings often go hand in hand, the combined effect is a substantial 54 basis points. These findings mirror the results of King and Khang (2002) who, in their analysis of US corporate yield spreads, establish similar rating effects in addition to typical financial determinants such as leverage and free-cash flow quality, in themselves factors affecting credit ratings.



In terms of project type, water and transportation projects come to the market at, respectively, 135 and 233 bpts higher than other projects. A possible explanation might lie in the fact that these two types of projects are particularly vulnerable in terms of asset-specificity, unilateral redefinition of property rights, and demand risk.



The analysis suggests that covenant protection and, more generally, contractual devices alone are insufficient to overcome shortcomings in the host country's legal, financial, and political institutions. Investors, through their pricing behavior, take into account the quality of the ambient institutional environment. Given the very specific nature of the assets, the scope for opportunistic behavior and the concentrated nature of economic and financial risk inherent in project finance, well-functioning legal, economic, and political institutions provide better investor protection than bond covenants. Bondholders, in turn, reward projects located in host countries that adhere to the rule of law with tighter credit spreads and, hence, lower funding costs. Instead, covenants can serve as incentive devices to all stakeholders in a project including host governments and regulators. Built around easily understood and enforced standard provisions, they include provisions that make it very costly for local parties—government and direct stakeholders—to enhance their own stakes in the project to the detriment of bondholders.

Our findings mirror the results of Elton *et al.* (2001) who show for a sample of US corporate bonds that expected default accounts for a surprisingly small fraction of the credit spread. While tax effects explain a substantial portion of the spread, the authors find that factors explaining risk premia for common stock also drive credit spreads.

V. Discussion and Conclusion

This note highlights several important characteristics of international project bond markets. It provides an empirical perspective on typical project-bond covenant provisions on the basis of a sam-

ple of project-related fixed income securities issued in international capital markets from January 1993 to March 2002. Furthermore, we complement the discussion of covenant provisions with an analysis of the degree to which the level of institutional development of the projects' host countries matters for the pricing of the bonds.

We find that fixed income investors price both the contractual design of the actual debt security and its ambient institutional environment. As a more detailed analysis of typical project-bond covenants reveals, issuers anticipate concerns by lenders that arise from the particular nature of infrastructure projects, i.e., the assets' location specificity, threat of renegotiation, unilateral regulatory changes, and unilateral redefinition of property rights. At the same time, covenants also strive to implement managerial incentives for owners and operators of project that, hitherto, was thought of as falling into the domain of shareholders. Hence, we conclude that bondholders play a much more active role in the design and governance of project bonds than is the case for traditional corporate bonds.

Our analysis also shows that one cannot view the contractual arrangements of project in isolation from the ambient legal and regulatory environment. Controlling for economic and financial development of the host country, we find that the level of institutional development and, especially, proxies for the rule of law significantly affect market risk perceptions and project-bond pricing. This find is hardly surprising in light of our covenant analysis. In the last consequence, private contracting—rarely able to specify a complete contract—needs to rely on host-country legal institutions to enforce local provisions, contracts and property rights. Hence, two conclusions emerge. First, private contractual arrangements and ambient legal institutions are complements rather than substitutes. Second, investing in building appropriate institutions can decrease the cost of infrastructure development beyond their immediate benefits for society at large.

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APPENDIX

Table 1
Project Bonds Summary Statistics

This table presents summary statistics of various attributes of the global project bonds represented in our sample that are primarily drawn from emerging economies by issue type.

Type	N	Spread	Amount	Maturity	Moody's Rating
Emerging economies	105	297.80	278.07	11.82	Baa3
Latin America	56	333.64	233.40	10.46	Baa3
Asia	43	251.94	322.91	13.38	Baa3
Europe	3	208.33	200	7.33	Baa3
Middle-East and North Africa	2	162.5	600	13.77	A3
Africa	1	802.17	396.825	30	Baa1
Fixed rate	98	296.43	287.14	12.27	Baa2
Variable rate	7	316.96	171.86	5.52	A3
Senior	94	293.11	289.75	12.5	Baa3
Secured	34	343.46	237.20	12.4	Ba1
Unsecured	62	276.10	307.98	11.69	Baa2
Asset-backed	42	312.07	248.73	12.30	Baa2
Chemical	1	227.30	250.00	22	Baa3
Energy	39	312.60	322.42	11.4	Baa1
Power	38	254.50	227.90	13.1	Baa1
Telecom	12	310.40	286.67	9.01	Baa2
Transmission	6	359.80	181.50	8.36	Baa1
Transport	9	432.20	321.20	13.1	Ba1
Water	4	418.50	192.88	9.86	Ba2
Other	3	230.20	201.17	8.95	Ba1

Table 2
Economic Indicators and Institutional Environment

The country variables are 1995-1999 averages where per capita GDP is real GDP per capita in USD, Inflation log difference of the consumer price index, Growth the GDP growth rate in current USD, and Financing, Legal, and Corruption Obstacle are summary business environment variables from firm responses to the World Business Environment Survey (WBES). They take integer values 1 to 4, with higher values indicating greater obstacles. Firm variables are averaged over all firms in each country. The last table provides more detailed variable definitions and explanations.

Country	GDP per capita	Inflation	Growth	Credit Rating	ICRG		Legal Obst.	Corruption Obst.
					Composite	Financing Obst.		
Argentina	7990	0.06	1	Ba3/B1	73.21	2.990	2.327	2.622
Brazil	4486	16.07	.8	B2	65.19	2.692	2.543	2.490
Chile	5001	5.97	4.4	Baa1	78.42	2.410	1.990	1.867
China	677	4.74	7.6	A3	73.42	3.347	1.564	2.031
Colombia	2383	16.67	-0.6	Baa3	60.74	2.640	2.370	2.780
Czech Republic	5170	7.37	1.6	A1	79.79	3.136	2.126	2.136
Dominican Republic	1742	7.11	5.2	B1	69.89	2.640	2.482	2.936
Hong Kong	22619	3.75	0	A3	80.08	1.859	1.323	1.250
India	414	8.32	4.6	Ba1	66.82	2.548	2.011	2.797
Indonesia	1044	17.56	0	B3	60.69	2.860	2.198	2.630
Korea	11480	4.29	3.8	Baa2	78.51	2.291	1.905	2.161
Malaysia	4539	3.40	2.6	A1	76.53	2.316	1.685	1.852
Mexico	3395	21.70	1.4	Ba2	68.55	3.192	2.835	3.327
Panama	3124	0.98	1.6	Baa1	69.45	2.101	2.474	2.859
Philippines	127	7.45	1.4	Ba1	69.91	2.680	2.283	3.110
Qatar		3.58		Ba1	70.05	2.915	1.659	3.149
Russia	2222	49.40	-1	Ba2	59.99	3.210	2.130	2.553
South Africa	3936	7.07	0.6	Baa3	72.75	2.382		2.598
Thailand	2839	4.83	1	A2	73.16	3.112	2.125	3.471
Venezuela	3483	41.55	-1.2	Ba3	65.73	2.566	2.719	3.031

Table 3
Summary Statistics and Correlations

Summary statistics are presented in Panel A and correlations are presented in Panel B. N refers to the number of bonds, countries, or WBES firm-level observations for the 20 countries represented in our sample. GDP, Inflation, Growth, and Financing, Legal, and Corruption Constraints are as previously defined. The various other financing, legal, and corruption variables are average responses by firms to the WBES questionnaire. Higher numbers indicate greater obstacles, with the exception of “Firms have to make ‘additional payments’ to get things done” and “Firms know the amount of ‘additional payments’ in advance”. Detailed variable definitions and sources are contained in the last table.

Panel A: Summary Statistics

Variable	Label	Obs.	Mean	Std. Dev.	Min	Max
Spread over US Treasuries	SPREAD	105	297.80	173.81	10	802.172
Amount issued	AMOUNT	105	278.07	201.62	23	1000
Maturity (years)	MAT	105	11.82	10.5	2.97	100
Credit rating index	CRI	105	8.57	3.22	0	14
Country credit rating index	CCRI	105	9.06	3 notches	A1	B3
Inflation	INF	105	11.96	11.39	.61	49.40
GDP per capita	GDPCAP	105	3905.42	3397.53	414	22618.60
GDP (million \$)	GDP	105	280.3	266.05	8.8	870.2
Economic growth	GROWTH	105	2.15	2.40	-1.2	7.6
Infrastructure development	INFRA	105	2.21	0.38	1.35	3.23
Financing	FINANCE	105	2.79	0.38	1.86	3.35
Exchange rate	FXRATE	105	2.65	0.65	1.38	3.63
Quality of Legal Institutions	LEGAL	105	2.19	0.50	0	2.84
Corruption	CORRUPT	105	2.60	0.60	1.25	3.47
Taxes & regulation	TREG	105	2.76	0.60	1.50	3.61
Policy instability and uncertainty	POLINST	105	2.86	0.57	1.47	3.64

Panel B: Correlation Matrix of Key Variables

	Spread	Amount	Maturity	CRI	CCRI	GDP(\$)	GDP/capita	Growth	Inflation	Infrastruct.	Financing	FX Rate	Legal	Taxes & Reg.	Corruption
Amount	-0.23														
Maturity	-0.15	-0.01													
CRI	0.46	-0.05	-0.07												
CCRI	0.47	-0.30	-0.14	0.08											
GDP(\$)	0.41	-0.11	-0.19	-0.03	0.29										
GDP/cap	-0.03	0.13	-0.11	-0.06	-0.07	-0.11									
Growth	-0.31	0.14	0.03	-0.14	-0.32	0.14	-0.05								
Inflation	-0.04	-0.08	0.19	0.02	0.41	-0.12	-0.20	-0.26							
Infrastructure	0.27	-0.28	0.06	0.21	0.38	-0.09	-0.47	-0.45	0.40						
Financing	0.33	-0.26	-0.21	-0.11	0.31	0.58	-0.16	-0.13	0.12	0.29					
FX Rate	0.25	-0.17	0.02	0.17	0.44	-0.11	-0.33	-0.45	0.57	0.79	0.24				
Legal Obst.	0.33	-0.26	-0.03	-0.01	0.78	0.09	-0.20	-0.39	0.63	0.53	0.43	0.66			
Taxes & Reg.	0.46	-0.28	-0.20	0.01	0.79	0.21	0.01	-0.51	0.33	0.51	0.52	0.60	0.76		
Corruption	0.32	-0.28	0.02	0.00	0.63	0.07	-0.37	-0.42	0.54	0.80	0.54	0.75	0.86	0.69	
Policy Inst.	0.35	-0.32	-0.09	-0.03	0.80	0.16	-0.17	-0.55	0.63	0.60	0.45	0.71	0.88	0.87	0.81

Table 4
Economic and Institutional Determinants of Project Bond Spreads

$$SPREAD_i = \beta_0 + \sum_{1 \leq k \leq K_1} \beta_k ISSUE_{ki} + \sum_{K_1 < k \leq K_2} \beta_k BCOV_{ki} + \sum_{K_2 < k \leq K_3} \beta_k 1_{IND_{ki}} + \sum_{K_3 < k \leq K_4} \beta_k PROJ_{ki} \\ + \sum_{K_4 < k \leq K_5} \beta_k x_{kj} + \sum_{K_5 < k \leq K_6} \beta_k INST_{kj} + \sum_{K_6 < k \leq K_7} \beta_k \hat{BCOV}_{kj} \cdot INST_{kj} + v_{ij}, \quad v_{ij} = e_{ij} + u_i$$

where the dependent variable *SPREAD* is the project bond's at-issue spread over US Treasuries, *ISSUE* the relevant issue information (amount, maturity, rating), *BCOV* the bond's covenant provisions (seniority, collateral, etc.), *IND* industry indicator variables (energy, power, water, etc.), *PROJ* a set of variables capturing financial and economic aspects of the underlying project, *x* a set of host country *j* economic indicators (GDP, growth, etc.), *INST* indices measuring host country *j*'s quality of financial, legal and political institutions, and the last term an interactive one.

Specification	1		2
Constant	234.2358 (0.3147)	Constant	-254.5744 (0.0318)
Economic indicators:		Economic indicators:	
GDP in USD millions	0.0689 (0.3873)	Country credit rating	-39.4783 (0.2219)
Growth	-5.8360 (0.1662)	Issue terms:	
		Issue credit rating	31.6986 (0.0000)
Institutional obstacles:			
Financing constraints	87.5000 (0.1238)	Amount	-0.0008 (0.9891)
Legal obstacles	144.0655 (0.0333)	Maturity	2.0267 (0.0535)
Change in legal confidence	-142.9761 (0.2310)	Secured	-39.4783 (0.2219)
Policy instability	-321.8449 (0.0000)	Unsecured	-61.1755 (0.0722)
Taxes and regulation	159.8684 (0.0311)	Asset-backed	49.5075 (0.2011)
ICRG composite risk index	18.4925 (0.0000)	Guaranteed	24.7833 (0.0219)
ICRG corruption index	-174.3331	Sector	
		Energy	54.3452 (0.2912)
		Power	-17.4807 (0.7434)
		Telecommunications	56.7352 (0.3623)
		Transportation	233.3951 (0.0001)

Specification	1	2
	Water	135.3451 (0.0543)
	Transmission	-107.5791 (0.0893)
Adjusted R²	0.46	0.54
Observations	105	103
No. of countries	20	20

Table 5
Variable Definitions and Data Sources

The following table summarized our explanatory variables in terms of definition and origin. Together with our data from the World Bank's World Development Indicators (WDI), it contains all variables extracted from the World Business Environment Survey (WBES) and, in particular, the relevant underlying questions and possible answer choices in the firm survey.

Variable	Label	Definition	Source
<i>Economic Indicators</i>			
GDP	GDP	GDP in current U.S. dollars, observed in bond's issue year	WDI
GDP per capita	GDPCAP	Real per capita GDP, observed in bond's issue year	WDI
Country Credit Rating Index	CCRI	Index of host-country credit rating (average of Moody's and S&P)	
Credit Rating Index	CRI	Index of issue's credit rating (average of Moody's and S&P)	
Growth	GROWTH	Growth rate of GDP, observed in bond's issue year	WDI
Inflation rate	INFLAT	Log difference of Consumer Price Index, observed in bond's issue year	WDI
ICRG Corruption Index	ICRGCORR	International Country Risk Group index of host-country corruption (rescaled: higher values correspond to more corruption)	PRS Group
ICRG Composite Index	ICRGCOMP	International Country Risk Group index of host-country political, economic and financial risk (rescaled: higher values correspond to higher risk)	PRS Group
<i>Major Environment Categories</i>			
Each firm was asked to select three major business impediments out of 12 broad categories to which the following variables belong.			
Financing Obstacle	FIN	How problematic is <i>financing</i> for the operation and growth of your business: no obstacle (1), a minor obstacle (2), a moderate obstacle (3) or a major obstacle (4)?	WBES
Legal Obstacle	LEGAL	How problematic is <i>functioning of the judiciary</i> for the operation and growth of your business: no obstacle (1), a minor obstacle (2), a moderate obstacle (3) or a major obstacle (4)?	WBES
Change in Legal Confidence	DLEG	Difference in reply over three years to: I am confident that the legal system will uphold my contract and property rights in business disputes: (1) fully agree, (2) agree in most cases, (3) tend to agree, (4) tend to disagree, (5) disagree in most cases, (6) fully disagree	WBES
Taxes and Regulation Obstacle	TREG	How problematic are <i>taxes and regulations</i> for the operation and growth of your business: no obstacle (1), a minor obstacle (2), a moderate obstacle (3) or a major obstacle (4)?	WBES
Political Instability Obstacle	POLITI	How problematic is <i>political instability</i> for the operation and growth of your business: no obstacle (1), a minor obstacle (2), a moderate obstacle (3) or a major obstacle (4)?	WBES
Corruption Obstacle	CORR	How problematic is <i>corruption</i> for the operation and growth of your business: no obstacle (1), a minor obstacle (2), a moderate obstacle (3) or a major obstacle (4)?	WBES

Variable	Label	Definition	Source
Infrastructure Obstacle	INFRA	How problematic is <i>infrastructure</i> for the operation and growth of your business: no obstacle (1), a minor obstacle (2), a moderate obstacle (3) or a major obstacle (4)?	WBES
Exchange Rate Obstacle	FXRATE	How problematic are <i>exchange rates</i> for the operation and growth of your business: no obstacle (1), a minor obstacle (2), a moderate obstacle (3) or a major obstacle (4)?	WBES

Table 6
Project Bonds

The following table provides a detailed overview of our sample by reporting each bond's issue terms and legal structure. The information comes from the issue documentation and third sources such as Bloomberg, IDC, and Thomson Financial Securities Data. *Country* refers to the host-country, the *Maturity* is the project bond's time to redemption in years, the *At-issue Spread* the bond's yield spread over maturity-matched US Treasury securities, the *Host-Country Spread* the sovereign spread of the country's EMBI Global (JP Morgan) country index over US Treasuries, and all the other variables are self-explanatory.

Country	Project	Sector	Issue Date	Maturity	Amount	At-issue Spread	Host-Country Spread	Ratings	Structure
ARGENTINA	CAPEX S.A.	Power	9-Jan-98	6.40	105.00	324.625	559	BB	Senior, Unsecured
ARGENTINA	Empresa Distribuidora de Energia Norte S.A.		14-Aug-98	5.00	125.00	246.375	689	BBB-	Senior, Unsecured
ARGENTINA	Inversora Electrica de Buenos Aires S.A.	Power	24-Sep-97	5.00	100.00	266	314	BB+	Pari passu, Asset Backed
ARGENTINA	Inversora Electrica de Buenos Aires S.A.	Power	24-Sep-97	7.00	130.00	292	314	BB+	Pari passu, Asset Backed
ARGENTINA	Metrogas S.A.	Power	27-Mar-00	3.00	350.00	353	517	B1	Senior, Secured
ARGENTINA	Transportadora de Gas del Norte S.A. (TGN)	Energy	27-Jun-97	7.00	24.00	211.891	344	BBB-	Senior, Unsecured
ARGENTINA	Transportadora de Gas del Norte S.A. (TGN)		25-Jul-00	12.00	175.00	486.926	620	BBB-	Senior, Unsecured
ARGENTINA	Transportadora de Gas del Sur S.A. (TGS)	Energy	25-Apr-00	3.00	150.00	423	638	B1	Senior, Unsecured
BRAZIL	Companhia Petrolifera Marlim	Energy	26-Sep-00	8.00	200.00	662	659	B2	Senior, Secured
BRAZIL	Companhia Petrolifera Marlim		17-Dec-99	5.00	200.00	715	567	B2	Senior, Secured
BRAZIL	Eletrobras - Centrais Eletricas Brasileiras S.A.	Power	27-Jun-96	8.00	250.00	338	681	B+	Senior, Unsecured
BRAZIL	Eletrobras - Centrais Eletricas Brasileiras S.A.		9-Jun-00	5.00	300.00	568	650	B+	Senior, Unsecured
BRAZIL	Espirito Santo Centrais Eletricas S.A.	Power	28-Jul-97	10.00	500.00	387.5	323	B1	Senior, Unsecured

Country	Project	Sector	Issue Date	Ma- turity	Amount	At- issue Spread	Host- Country Spread	Ratings	Structure
BRAZIL	LIGHT- Servicos de Eletricidade S.A.	Power	13-Oct-00	5.00	23.00	403.5	697	B1	Pari-Passu, Unsecured
CHILE	Chilgener S.A.	Power	26-Jan-96	10.00	200.00	99	793	Baa1	Senior, Unsecured
CHILE	EDELNOR S.A.	Power	27-Mar-96	10.00	250.00	148.967	836	Baa1	Senior, Unsecured
CHILE	Empresa Electrica del Norte Grande S.A.	Power	2-Apr-98	7.00	90.00	480	450	Baa1	Senior, Unsecured
CHILE	Empresa Electrica Guacolda S.A.	Power	29-Apr-96	7.00	80.00	143.992	729	Baa3	Senior, Secured
CHILE	Empresa Electrica Pehuenche S.A.	Power	2-May-96	7.00	170.00	90	741	Baa1	Senior, Unsecured
CHILE	Enersis S.A.	Power	26-Nov-96	10.00	300.00	82	498	Baa1	Senior, Unsecured
CHILE	SCL Terminal Aereo Santiago S.A.	Transport	22-Dec-98	13.53	213.00	237.5	953	Baa2	Senior, Secured & Asset Backed
CHILE	Telefonica CTC Chile S.A.	Telecom	25-Jul-96	10.00	200.00	83	700	Baa1	Senior, Unsecured
CHILE	Telefonica CTC Chile S.A.	Telecom	8-Jan-99	7.00	200.00	350	931	Baa1	Senior, Unsecured
CHINA	AES China Generating Co. Ltd.	Power	19-Dec-96	10.00	180.00	375	479	Ba3	Senior, Unsecured
CHINA	Cathay International Limited	Transport	15-Apr-98	10.00	350.00	745	440	Ba3	Senior, Unsecured
CHINA	China Mobile (Hong Kong) Ltd.	Telecom	2-Nov-99	5.00	600.00	190	712	A3/BBB	Senior, Unsecured
CHINA	China Telecom (Hong Kong) Ltd.	Telecom	31-Oct-00	5.00	690.00	240	657	Baa2	Senior, Unsecured
CHINA	GH Water Supply [Holdings] Limited	Water	22-Dec-00	10.00	400.00	194.667	741	Ba3	Senior, Secured & Asset Backed
CHINA	Guangzhou-Shenzhen Superhighway (Holdings) Ltd.	Transport	11-Aug-97	7.00	200.00	375	313	Ba3	Senior, Unsecured
CHINA	Guangzhou-Shenzhen Superhighway (Holdings) Ltd.	Transport	11-Aug-97	10.00	400.00	412.5	313	Ba3	Senior, Unsecured

Country	Project	Sector	Issue Date	Ma- turity	Amount	At- issue Spread	Host- Country Spread	Ratings	Structure
CHINA	Huaneng Power International Inc.	Energy	21-Nov-97	6.50	230.00	10	473	BBB	Senior, Un-secured
CHINA	Suzhou Development Trust		7-Oct-97	15.00	103.50	237.748	297	Ba3	Pari-Passu, Asset Backed Guaranteed Senior, Un-secured
CHINA	Zhuhai Highway Co.	Other Transport	7-Aug-96	10.00	85.00	250	655	Baa3	Senior, Un-secured
CHINA	Zhuhai Highway Co.	Transport	7-Aug-96	12.00	115.00	475	655	Baa3	Senior, Un-secured
COLOMBIA	Oil Purchase Company II	Energy	11-May-99	5.00	175.60	532.896	698	Ba2	Senior Secured & Asset Backed
COLOMBIA	Oleoducto Central S.A.		28-Jun-95	10.00	150.00	324.624	1109	Baa3	Senior Secured & Guaranteed
COLOMBIA	TermoEmcali Funding Corp.	Power	16-Apr-97	17.68	165.00	300.013	435		Senior, Secured
COLOMBIA	TransGas de Occidente S.A.	Transmission	10-Nov-95	15.00	240.00	359.429	1187	Baa3	Senior, Secured
COLOMBIA	Transtel	Telecom	28-Oct-97	10.00	150.00	651.944	468	B2	Senior, Secured
CZECH REP.	Aero Vodochody		17-Nov-98	7.00	200.00	280	920	Baa1	Senior, Un-secured & Asset Backed
CZECH REP.	CEZ Finance BV	Other	22-Jul-97	10.00	200.00	95	340	Baa1	Guaranteed Senior, Un-secured & Asset Backed
DOMINICAN REP.	Tricom	Power	21-Aug-97	7.00	200.00	510	314	B2	Senior, Un-secured & Asset Backed
HONG KONG	Kowloon Canton Railway Corp.	Telecom Transport	16-Mar-00	10.00	1000.00	168	530	A3	Senior, Un-secured
HONG KONG	New World Infrastructure Limited	Other	24-Mar-98	5.00	300.00	173	434	Ba3	Senior, Un-secured
INDIA	Tata Electric Companies (The)		12-Aug-97	10.00	150.00	160	309	Baa3	Senior, Un-secured
INDIA	Tata Electric Companies (The)	Power	12-Aug-97	20.00	150.00	193	309	Baa3	Senior, Un-secured
INDONESIA	DSPL Finance Company B.V.	Power	28-Aug-96	14.35	150.00	219.326	617	Baa3	Senior, Secured & Asset Backed Guaranteed

Country	Project	Sector	Issue Date	Ma- turity	Amount	At- issue Spread	Host- Country Spread	Ratings	Structure
KOREA	Korea Electric Power Corp.	Power	31-Mar-00	5.00	300.00	190	556	Ba1	Senior, Un-secured
MALAYSIA	Petroliaam Nasional Berhard	Energy	1-Jul-93	10.00	500.00	98	405	A2	Senior, Un-secured
MALAYSIA	Petroliaam Nasional Berhard	Energy	17-Aug-95	10.00	375.00	69	1056	A1	Senior, Un-secured
MALAYSIA	Petroliaam Nasional Berhard	Energy	17-Aug-95	20.00	625.00	86	1056	A1	Senior, Un-secured
MALAYSIA	Petroliaam Nasional Berhard	Energy	18-Oct-96	10.00	800.00	57	536	A1	Senior, Un-secured
MALAYSIA	Petroliaam Nasional Berhard	Energy	12-Aug-99	5.00	650.00	320	844	Baa3	Senior, Un-secured
MALAYSIA	Telekom Malaysia	Telecom	10-Aug-95	10.00	200.00	72	1022	A1	Senior, Un-secured
MALAYSIA	Telekom Malaysia	Telecom	3-Aug-95	10.00	300.00	102	1071	A1	Senior, Un-secured
MALAYSIA	Tenaga Nasional Berhad	Power	22-Jun-94	10.00	600.00	89	874	A2	Senior, Un-secured
MALAYSIA	Tenaga Nasional Berhad	Power	31-Oct-95	30.00	350.00	121.906	1124	A1	Senior, Un-secured
MALAYSIA	Tenaga Nasional Berhad	Power	16-Jan-96	100.00	150.00	155.406	866	A1	Senior, Un-secured
MALAYSIA	Tenaga Nasional Berhad	Power	29-Apr-97	10.00	300.00	42	407	A1	Senior, Un-secured
MALAYSIA	Tenaga Nasional Berhad	Power	29-Apr-97	10.00	500.00	73	407	A1	Senior, Un-secured
MALAYSIA	Tenaga Nasional Berhad	Power	4-Apr-01	10.00	600.00	295	753	Baa3	Senior, Un-secured
MEXICO	Conproca S.A. De C.V	Energy	30-Jun-98	12.00	370.30	653	598	Ba2	Senior, Secured & Asset Backed
MEXICO	El Habal Funding Trust	Power	17-Jun-98	13.00	60.00	471.956	540	Ba2	Senior, Secured & Asset Backed
MEXICO	Fideicomiso Petacalco	Power	23-Apr-97	13.00	308.90	325	421	Ba2	Senior, Secured & Asset Backed
MEXICO	Monterrey Power, S.A. de C.V.	Power	24-Apr-98	11.57	235.54	400	445	Ba2	Guaranteed Senior, Secured & Asset Backed
MEXICO	Pemex Finance	Energy	14-Dec-98	20.00	250.00	412.5	1027	Baa1	Pari-Passu Asset Backed

Country	Project	Sector	Issue Date	Ma- turity	Amount	At- issue Spread	Host- Country Spread	Ratings	Structure
MEXICO	Pemex Finance		14-Dec-98	8.42	350.00	350	1027	Baa1	Pari-Passu Asset
MEXICO	Pemex Finance	Energy	25-Feb-99	8.00	200.00	362.5	961	Baa1	Backed Pari-Passu Asset
MEXICO	Pemex Finance	Energy	25-Feb-99	11.73	200.00	400	961	Baa1	Backed Pari-Passu Asset
MEXICO	Pemex Finance	Energy	25-Feb-99	5.00	300.00	115	961	Aaa	Backed Pari-Passu Asset
MEXICO	Pemex Finance	Energy	27-Jul-99	5.00	50.00	380	838	Baa1	Backed Pari-Passu, Unsecured & Asset
MEXICO	Pemex Finance	Energy	27-Jul-99	18.00	200.00	475	838	Baa1	Backed Pari-Passu, Unsecured & Asset
MEXICO	Pemex Finance	Energy	27-Jul-99	5.00	225.00	365	838	Baa1	Backed Pari-Passu, Unsecured & Asset
MEXICO	Pemex Finance	Energy	27-Jul-99	13.00	250.00	137.01 9	838	Aaa	Backed Pari-Passu, Unsecured & Asset
MEXICO	Pemex Finance	Energy	27-Jul-99	10.00	600.00	400	838	Baa1	Backed Pari-Passu, Unsecured & Asset
MEXICO	Pemex Finance	Energy	10-Feb-00	13.00	150.00	150	532	Aaa	Backed Senior, As- set Backed
MEXICO	Pemex Finance	Energy	10-Feb-00	11.00	800.00	275	532	Baa1	Backed Senior, As- set Backed
MEXICO	Pemex Finance	Energy	12-Feb-01	7.00	1000.00	360	674	Baa1	Backed Senior, Un- secured As- set Backed
MEXICO	Pemopro S.A. de C.V.	Energy	26-Oct-99	3.35	161.00	455.25	708	Ba1	Backed Senior, Se- cured Gu- ranteed
MEXICO	Proyectos de Energia, S.A. de C.V.	Energy	14-May- 98	5.00	100.00	405.41 9	479	Ba2	Backed Senior, Se- cured & Asset
PANAMA	PYCSA Panama S.A.	Power Trans- port	6-Oct-97	15.00	131.00	425	299	Ba3	Backed Senior, Un- secured

Country	Project	Sector	Issue Date	Ma-turity	Amount	At- issue Sprea d	Host- Coun- try Spread	Ratings	Structure
PHILIPPINES	Buang Private Power Corp.		28-Mar-96	12.00	85.00	366.14 3	850	Ba2	Senior, Se- cured & Asset Backed
PHILIPPINES	CE Casecan Water and En- ergy Co. Inc.	Power Wa- ter&Ener gy	21-Nov-95	7.00	75.00	337.10 9	1140	Ba2	Guaranteed Senior, Se- cured & Asset Backed
PHILIPPINES	CE Casecan Water and En- ergy Co. Inc.	Wa- ter&Ener gy	27-Nov-95	10.00	125.00	556.83 2	1125	Ba2	Senior, Se- cured & Asset Backed
PHILIPPINES	CE Casecan Water and En- ergy Co. Inc.	Wa- ter&Ener gy	27-Nov-95	15.00	171.50	585.34 5	1125	Ba2	Senior, Se- cured & Asset Backed
PHILIPPINES	Globe Telecom	Telecom	27-Mar-02	10.00	200.00	442	487	Ba3	Senior, Un- secured
PHILIPPINES	Globe Telecom	Telecom	6-Aug-99	10.00	220.00	709	872	B1	Senior, Un- secured
PHILIPPINES	National Power Corp.		13-Dec-96	10.00	200.00	167	492	Ba2	Senior, Un- secured & Asset Backed
PHILIPPINES	National Power Corp.	Power	13-Dec-96	20.00	160.00	190	492	Ba2	Senior, Un- secured & Asset Backed
PHILIPPINES	National Power Corp.	Power	6-May-98	30.00	300.00	386.5	460	Ba1	Senior, Un- secured & Asset Backed
PHILIPPINES	Quezon Power (Philippines) Ltd.	Power	3-Jul-97	10.00	215.00	245	330	Ba1	Senior, Se- cured
QATAR	Ras Laffan Liq- uefied Natural Gas Co. Ltd.	Energy	12-Dec-96	10.00	400.00	137.5	498	A3	Senior, Se- cured
QATAR	Ras Laffan Liq- uefied Natural Gas Co. Ltd.	Energy	12-Dec-96	18.00	800.00	187.5	498	A3	Senior, Se- cured
RUSSIA	Mosenergo, AO	Power	9-Oct-97	5.00	200.00	250	305	BB-	Senior, Un- secured
SOUTH AFRICA	Transnet Ltd.	Trans- port	17-Apr-98	30.00	396.82	802.17 2	447	Baa1	Senior, Un- secured & Guaranteed

Country	Project	Sector	Issue Date	Ma- turity	Amount	At- issue Spread	Host- Country Spread	Ratings	Structure
THAILAND	EGAT		6-Oct-98	10.00	300.00	285	1196	A3	Senior, Un- secured & Asset Backed
THAILAND	Jasmine Subma- rine Telecom- munications co. Ltd	Power	29-May- 97	14.00	180.00	175	354	Baa1	Guaranteed Senior, Se- cured & Asset Backed
THAILAND	Total Access Communications	Telecom	4-Nov-96	10.00	300.00	200	519	BB-	Senior, Un- secured
VENEZUELA	Cerro Negro Finance Ltd.	Telecom	18-Jun-98	11.46	200.00	180	560	Baa1	Senior, Se- cured & Asset Backed
VENEZUELA	Cerro Negro Finance Ltd.	Energy	18-Jun-98	22.47	350.00	225	560	Baa1	Senior, Se- cured & Asset Backed
VENEZUELA	Cerro Negro Finance Ltd.	Energy	18-Jun-98	30.00	50.00	237.5	560	Baa1	Senior, Se- cured & Asset Backed
VENEZUELA	Fertinitro Finan- ce Inc.	Energy	21-Apr-98	22.00	250.00	227.31 7	442	Baa3	Guaranteed Senior, Se- cured
VENEZUELA	Petrozuata Fi- nance Inc. or Petrolera Zuata	Chemical	27-Jun-97	12.00	300.00	120	344	Baa1	Senior, Se- cured & Asset Backed
VENEZUELA	Petrozuata Fi- nance Inc. or Petrolera Zuata	Energy	27-Jun-97	20.00	625.00	145	344	Baa1	Guaranteed Senior, Se- cured & Asset Backed
VENEZUELA	Petrozuata Fi- nance Inc. or Petrolera Zuata	Energy	27-Jun-97	25.00	75.00	160	344	Baa1	Senior, Se- cured & Asset Backed
		Energy							Senior, Se- cured & Asset Backed

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